B. M. TOMBERLIN.

COLLAPSIBLE CRATE AND LOCK.

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1,229,677.

Patented June 12, 1917.

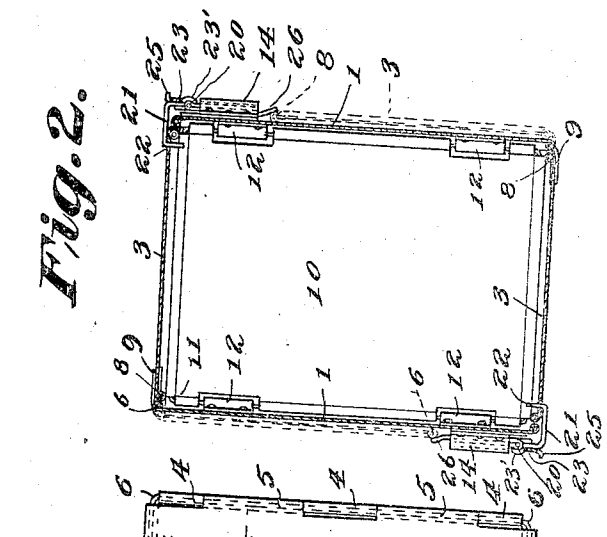


Fig. 2.

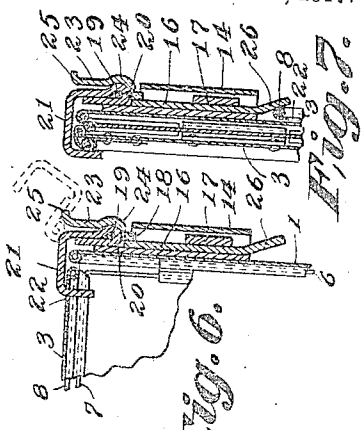


Fig. 7.

Fig. 6.

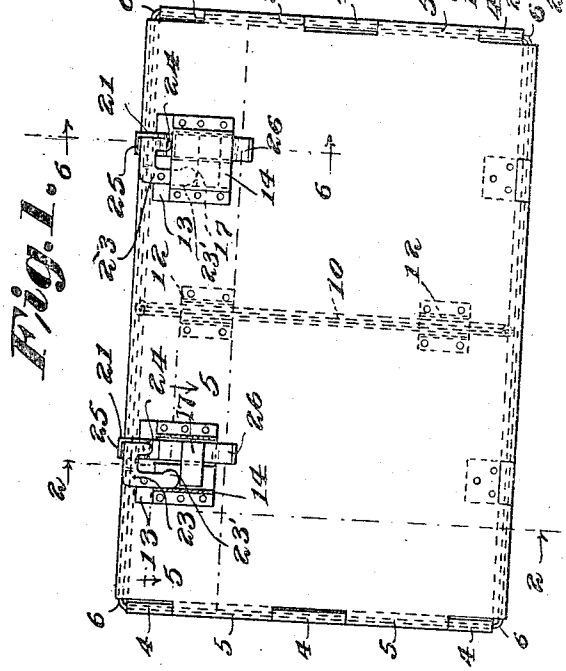


Fig. 1.

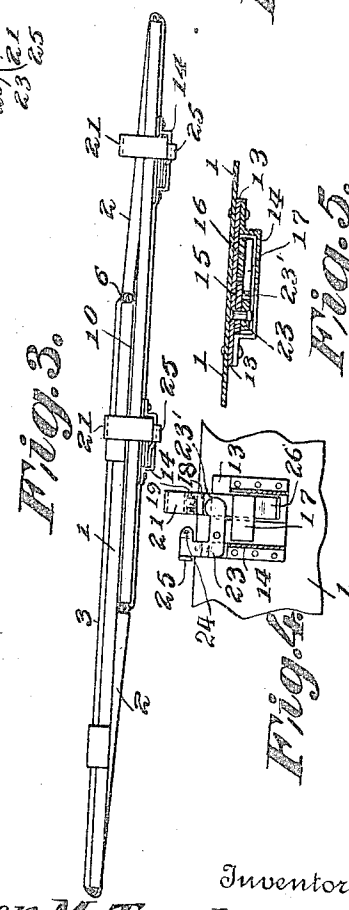


Fig. 3.

Fig. 5.

Fig. 4.

Witnesses

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COLLAPSIBLE CRATE AND LOCK.

1,229,677. Specification of Letters Patent. Patented June 12, 1917.

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To all whom it may concern:

Be it known that I, BAKER M. TOMBERLIN, a citizen of the United States, residing at Santa Rosa, in the county of Sonoma and State of California, have invented certain new and useful Improvements in Collapsible Crates and Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in locks for collapsible crates and to the combination thereof with such crates.

The object in view is the construction and location of locking elements relative and proportioned to the parts of collapsible crates for locking the crates both in their collapsed or folded and in their extended or unfolded positions.

With these and further objects in view, the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter specified and claimed.

In the accompanying drawing,—

Figure 1 is a view in side elevation of a crate embodying the features of the present invention, parts being seen in vertical section.

Fig. 2 is a transverse, vertical section therethrough taken on the planes indicated by line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the parts with the crate indicated as collapsed or folded.

Fig. 4 is a view, partly in section and partly in elevation, of a fragment of the crate showing one of the locks in its collapsed position.

Fig. 5 is a horizontal section taken on the planes indicated by line 5—5 of Fig. 1, and looking downwardly.

Fig. 6 is a vertical section taken on the plane indicated by line 6—6 of Fig. 1, a fragment only of the crate being illustrated.

Fig. 7 is a similar view of the same parts, the crate, however, being indicated as disposed in its collapsed position.

Referring to the drawings by numerals, 1, 1 indicate the side plates, 2, 2 the end plates, and 3, 3 the top and bottom plates of a collapsible crate which is illustrated as rectangular in cross section but which may, of course, assume any desired contour. The side and end plates are hinged together along their meeting vertical edges, the hinges consisting preferably of interlacing eyes 4, 4, and 5, 5, the former extending from the end plates and the latter from the side plates, and the eyes being connected by pintles, each consisting of a portion of a rod 6 which extends about all the edges of the respective side plate, the remaining portions of the rod 6 being inclosed by the rolled upper and lower edges of the respective side plate. Each end plate 2 has its edges bound by a similar rod 7 inclosed in edge rolls along the upper and lower edges of the respective end plate, and where the end plate is cut away to accommodate the eyes 5 the vertical edge of the respective end plate is rolled about the vertical portion of rod 7. Each top and bottom plate 3 is also provided with an edge stiffening or binding rod 8 which is inclosed in edge rolls of the material of the respective plate 3. The plates 1, 2 and 3 are of metal or other appropriate sheet material, preferably relatively thin, and in the drawing the thickness has been exaggerated to aid the clearness of disclosure.

The top plate 3 is hinged to the rear side plate 1 by hinge leaves 9 whose eyes are engaged by the horizontal portion of the wire 6 of the respective side 1, the bottom plate 3 being provided with the same form of leaves similarly engaged for forming a hinge connection between the bottom plate and the front side plate 1; thus the top plate 3 is adapted to be swung from the position indicated in Fig. 2 in full lines to a pendent vertical position as indicated in dotted lines in said figure, and the bottom plate is adapted to swing upon the hinges 9 to an upstanding vertical position along the front side plate 1, each of the plates 3 terminating when in the vertical position short of the respective adjacent edge of the given side plate 1, as clearly indicated by the dotted line in Fig. 1, the relative dimensions of the top and side plates enabling the top plate to be engaged by locking devices hereinafter described in detail.

A partition 10 is preferably arranged in the body of the crate and is hinged to the side plates 1 by being provided with an edge binding rod 11 about which the material at the edges of the partition is rolled, portions of the vertical edges being cut away at appropriate points for accommodating elongated brackets 12, 12, which are fixed to the inner surfaces of the respective plates 1, the said brackets forming loosely fitting eyes for

the rod 11, whereby the partition 10 is adapted to be sustained in its transverse position when the parts are unfolded, as indicated in Figs. 1 and 2, and the partition is at the same time free to be readily collapsed substantially into face contact with the side plates when the parts are collapsed as indicated in Figs. 3 and 7.

To lock the parts in their folded and unfolded positions, I preferably provide two locks spaced along the upper edge portion of the front plate and similar locks spaced along the lower edge portion of the rear plate 1. As each of these locks is an exact duplicate of all the others, a description of one will apply to all, and the same reference numerals will be applied throughout. Fixed to the respective side plate 1 is a stiffening plate 13 to which is fixed a housing 14, the plate 13 and housing 14 being preferably riveted to the respective plate 1. A plate 15 is fixed to plate 13 within housing 14 and forms a vertical groove or guideway for a preferably flat bolt 16. A lug or plate 17 is fixed to the bolt 16 intermediate its ends and extends laterally beyond the bolt, and spaced above the plate 17 is a similar lug or plate 18 also fixed to bolt 16. By preference the bolt 16 is formed of strap iron or other appropriate strip material, and when so formed the plate 18 is produced merely by folding the upper end portion of the strap back upon itself, but, obviously, the lug or plate 18 may be constructed in any desired manner. The upper end of the bolt 16 is bifurcated, and the arms of the bifurcation are formed into eyes engaged by pintle 19 which also passes through an eye 20 interposed between the eyes of the bifurcation and formed of the material of the lower portion of an upstanding hook 21. The hook 21 is proportioned for having its free end portion extend through an aperture 22 in the respective plate 3 when the parts are in their unfolded position, the said hook being adapted in operation to be moved upwardly by an upward thrust of the bolt 16 and then swung backwardly to the position indicated in dotted lines in Fig. 6, whereupon the plate 3 is left free to be swung to its vertical position. Pivoted to plates 13 and 15 is a lever 23 having a rounded end portion 23′ positioned with respect to its pivot and the space between lugs 17 and 18 such as to enter and leave the space when the lever 23 is swung upon its pivot and to move a certain distance upwardly within the space as that portion of the lever 23 carrying the rounded end portion 23′ moves upwardly. The opposite end of the lever 23 may be extended in any appropriate or convenient manner for facilitating manipulation, but preferably I arrange the same to extend as an arm substantially at a right angle, as clearly seen in Figs. 1 and 4, and form the terminal portion with a spring clip 24 and with an operating projection or flange 25, the clip 24 being positioned and proportioned to fit over the eye 20 when the bolt is in its locking position. As clearly indicated in Fig. 7, each hook 21 is dimensioned to inclose the several contiguous edges of the collapsed parts when the crate is in its folded position, the parts being so proportioned that the space occupied by the said collapsed parts is equal approximately to the space from the outermost portion of the hook to the aperture 22, so that the said hook is well adapted for either function of engaging the collapsed parts or engaging said aperture. The opposite end of the bolt 16 from that to which the hook 21 is connected is bent or extended diagonally, as indicated at 26, for accommodating the free edge of the respective plate 3, whereby the said plates are adapted to be locked in their vertical positions when the parts are collapsed as indicated in Fig. 7. The position of the bottom plate 3 is also indicated in Fig. 1 by the dotted line showing the location of the upper edge of the plate back of the extensions 26 and thus retained thereby.

When the parts are in their unfolded position, as indicated in full lines in Figs. 1 and 2, in order to open the crate it is only necessary to grasp the projections 25 and swing the upper portion of levers 23 upwardly until the rounded end portions 23′ enter the spaces between lugs 17 and 18, and engaging lugs 18 elevate the same with the bolts 16 until the hooks 21 are moved above and out of engagement with apertures 22. This movement of the levers 23, of course, causes the clips 19 to spring past the eyes 20 and to swing out to the out-of-the-way position indicated in Fig. 4. Thereupon the hooks 21 may be swung to the position indicated in dotted lines in Fig. 6, and the top plate 3 then swung rearwardly to the position indicated in dotted lines in Fig. 2. A closing and locking of the top plate 3 requires merely a reversal of the operation stated, the lever 23 during such reverse movement pressing downwardly on lug 17 and thus restoring the hooks 21 to their engaging positions. When the parts are thus locked, the spring clip 24 serves as a precautionary retaining means, but does not need to withstand any appreciable strain, because the end 23′ of lever 23 engages the upper edge of the lateral extension of lug or plate 17, and therefore, any strains imparting or tending to impart a longitudinal thrust to bolt 16 will be taken up as a direct longitudinal thrust by lever 23 against its pivot.

When it is desired to collapse the crate the top plate is swung back to its vertical position after the manner above described,

and the bottom plate 3 is likewise swung to its vertical position in the same manner and then the front and back side plates are caused to approach each other by diagonal movement until the parts are collapsed to the position indicated in Fig. 3, whereupon the several levers 23 are moved to the locking positions and the parts are thus engaged as indicated in Figs. 3 and 7.

What I claim is:—

1. In a folding crate, the combination with a collapsible structure having hinged members collapsible on each other, and a sliding bolt having a hinged hook carried by one end and adapted to engage and lock some of the parts in their unfolded position and some of the parts in their folded position, the said bolt having an extension disposed to engage other of the parts of the crate when folded and to clamp them against hook engaged parts.

2. In a folding crate, the combination with a collapsible structure, of a lock adapted to engage parts of the structure for locking them in an open position and to engage other parts of the structure for locking them in a folded position, means for locking them in a folded position, and means for locking the locking means in its locking positions.

3. In a folding crate, the combination with a collapsible structure, of a sliding bolt carried thereby and having means adapted to engage and lock parts of the structure in its open position and also to engage and lock parts of the structure in its closed position, a lever for shifting the bolt, and means on the bolt coöperating with the lever to lock the bolt.

4. In a folding crate, the combination with a collapsible structure, of a sliding bolt carried thereby and having means adapted to engage and lock parts of the structure in its open position and also to engage and lock parts of the structure in its closed position, and a lever for shifting the bolt, and means for locking the lever against movement.

5. In a folding crate, the combination with a collapsible structure, of a sliding bolt, a hook pivotally carried thereby and adapted to engage and lock certain of the parts of the structure in their unfolded position and to engage and lock other of the parts of the structure in their folded position, and a lever engaging the bolt for actuating the same, the lever having a portion adapted to engage the hook for retaining the hook against pivotal movement.

6. In a folding crate, the combination, with a collapsible structure, of a sliding bolt, a hook pivotally carried thereby and adapted to engage and lock certain of the parts of the structure in their unfolded position and to engage and lock other parts of the structure in their folded position, a lug outstanding both laterally and edgewise from the bolt, and a lever pivoted adjacent to the bolt in position for having one end engage the lug for effecting longitudinal shifting of the bolt by swinging the lever with said end in engagement with and moving along the lug, the lug being of sufficient length to be engaged by the lever when the lever arrives in substantially parallelism with the bolt.

In testimony whereof I affix my signature in presence of two witnesses.

BAKER M. TOMBERLIN.

Witnesses:
A. SCHAEFER,
G. E. BOWMAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."